

REMARKS

Claims 1, 3, 5-12, 14, 16-23, 25, 27-33 are pending in the present application. Claims 2, 4, 13, 15, 24, and 26 were canceled. Claims 1, 5, 12, 16, 23, and 27 were amended. Reconsideration of the claims is respectfully requested.

I. 35 U.S.C. § 102, Anticipation, Claims 1, 3, 5-9, 12, 14, 16-20

The examiner has rejected claims 1, 3, 5-9, 12, 14, 16-20 under 35 U.S.C. § 102 as being anticipated by LeCrone et al., U.S. Patent No. 6,714,430 ("LeCrone"). This rejection is respectfully traversed.

A prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 32 U.S.P.Q.2d 1031, 1034 (Fed. Cir. 1994). Anticipation focuses on whether a claim reads on the product or process a prior art reference discloses, not on what the reference broadly teaches. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983). In this case, each and every feature of the presently claimed invention is not shown in the cited reference as arranged in the claims.

Amended claim 1 of the present invention, which is representative of amended independent claim 12, reads as follows:

1. A method of managing copies of virtual volume data, comprising:
receiving an access request directed to an original virtual volume,
wherein the original virtual volume is associated with one or more original physical volumes contained on a first type of data storage media;
mapping the access request to a secondary virtual volume; and
performing the access request on one or more physical volumes
associated with the secondary virtual volume contained on a second type
of data storage media.

With regard to claim 1, the examiner stated:

As per claim 1, LeCrone teaches the invention as claimed including method for managing copies of virtual volume data comprises (e.g. see abstract) comprises receiving an access request directed to an original

virtual volume is equivalently taught as receiving I/O requests over a first communication channel to a first plurality of logical (virtual) devices (e.g. see column 12, lines 34-36); mapping the access request to a secondary virtual volume is taught as redirecting (mapping/switching) the I/O requests to the secondary logical devices and performing the access request on one or more physical volumes associated with the secondary virtual volume (e.g. see column 12, lines 7 et seq.; figure 1; column 3, lines 52-55 and column 5, lines 7-36).

Office Action, dated April 20, 2005, page 3.

LeCrone teaches a dynamic address switching system for use in a data processing system with redundant data storage facilities. LeCrone, Abstract. The data storage facilities are a local system and a remote system. LeCrone, column 4, lines 24-27. Each of the local and remote data storage facilities comprises a disk array storage device. LeCrone, column 4, lines 36 and 37. In other words, LeCrone teaches that the local and remote data storage facilities only utilize a disk storage array.

In contrast, as amended, claim 1 recites receiving an access request directed to an original virtual volume, wherein the original virtual volume is associated with one or more original physical volumes contained on a first type of data storage media, mapping the access request to a secondary virtual volume, and performing the access request on one or more physical volumes associated with the secondary virtual volume contained on a second type of data storage media. In other words, claim 1 recites that the physical volumes are contained on two different types of storage media. More specifically, the original physical volumes are contained on a first type of storage media and the physical volumes are contained on a second type of storage media as recited in claim 1. Hence, claim 1 of the present invention recites the use of two different types of storage media, whereas LeCrone only teaches the use of a disk array storage device.

But, the examiner cites LeCrone, column 4, lines 38 and 39 as teaching the above recited claim 1 limitation. This examiner cited passage states that the local and remote data storage facilities can have many forms. However, subsequent to the examiner cited passage, LeCrone states that:

For explaining this invention, each data storage facility is assumed to be a Symmetrix data storage facility. The specific data storage facilities have similar structures. For example, the local data storage facility

includes a host adapter that connects to a channel. The host adapter also connects to a bus that provides a communications path to a system memory and two sets of physical disk drives shown as including a disk controller with physical storage devices and another disk controller with physical storage devices.

Similarly, the remote data storage facility has....

As known, physical disk storage devices in such data storage facilities organize data in logical volumes. (emphasis added).

LeCrone, column 4, lines 39-59.

The passage above indicates that LeCrone makes reference to overall data storage facility architecture when LeCrone states that the data storage facilities can take many different forms. LeCrone teaches that the overall structure of the data storage facility does not have to be a Symmetrix data storage facility, which is used for illustration purposes, but may have internal structural differences. LeCrone does not make reference to using different storage media types, nor does LeCrone suggest the desirability of utilizing different storage media types for the local and remote data storage facilities. It is evident from the passage above that LeCrone only utilizes disc storage devices. As a result, LeCrone does not teach storing the original physical volumes on a first storage media type and the physical volumes on a second storage media type as recited in claim 1. Therefore, LeCrone does not identically teach each and every element of the present invention as recited in claim 1. Accordingly, the rejection of amended independent claims 1 and 12 as being anticipated by LeCrone has been overcome.

In view of the above arguments, amended independent claims 1 and 12 are in condition for allowance. As a result, claims 3, 5-9, 14, and 16-20 are dependent claims depending on independent claims 1 and 12 respectively. Consequently, claims 3, 5-9, 14, and 16-20 also are allowable, at least by virtue of their dependence on allowable claims. Furthermore, these dependent claims also contain additional features not taught by LeCrone.

For example, dependent claim 9 of the present invention, which is representative of dependent claim 20, reads as follows:

9. The method of claim 6, wherein the first secondary virtual volume includes physical volumes on a first media type and the second secondary virtual volume includes physical volumes on a second media type.

With regard to claim 9, the examiner stated:

As per claim 9, the different media types of the physical volumes associated with the virtual/logical volumes is taught by LeCrone since LeCrone clearly discloses data storage facilities 204 and 207 can have many different forms (e.g. see column 4, lines 38-39).

Office Action, page 5.

The examiner uses the same basis of rejection for claim 9 as he does for claim 1. As shown above, LeCrone does not teach storing the original physical volumes on a first storage media type and the physical volumes on a second storage media type as recited in claim 1, but merely teaches the use of a disc array storage device. Consequently, LeCrone cannot teach that the first secondary virtual volume includes physical volumes on a first media type and the second secondary virtual volume includes physical volumes on a second media type as recited in claim 9 of the present invention. Therefore, LeCrone does not identically teach the above recited claim 9 limitations.

Accordingly, the rejection of claims 1, 3, 5-9, 12, 14, 16-20 as being anticipated by LeCrone has been overcome.

II. 35 U.S.C. § 103, Obviousness, Dependent Claims 10-11 and 21-22

The examiner has rejected dependent claims 10-11 and 21-22 under 35 U.S.C. § 103 as being unpatentable over LeCrone in view of Schumacher, U.S. Patent No. 6,735,765 ("Schumacher"). This rejection is respectfully traversed.

The examiner bears the burden of establishing a *prima facie* case of obviousness based on the prior art when rejecting claims under 35 U.S.C. § 103. *In re Fritch*, 972 F.2d 1260, 23 U.S.P.Q.2d 1780 (Fed. Cir. 1992). For an invention to be *prima facie* obvious, the prior art must teach or suggest all claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). The examiner has not met this burden because all of the features of these claims are not found in the cited references as believed by the examiner. Therefore, the combination of LeCrone and Schumacher would not reach the presently claimed invention in these claims.

As shown in Section I above, LeCrone does not teach or suggest all the claim limitations recited in amended independent claims 1 and 12. In particular, LeCrone does

not teach or suggest that the original physical volumes are contained on a first type of storage media and the physical volumes are contained on a second type of storage media as recited in claims 1 and 12. These recited features are also not taught or suggested in Schumacher.

Therefore, since neither LeCrone nor Schumacher teach or suggest the claim limitations recited above in amended independent claims 1 and 12, then the combination of LeCrone and Schumacher cannot teach or suggest these features. As a result, claims 10, 11, 21, and 22 of the present invention also are allowable at least by virtue of their dependence on allowable claims. Furthermore, these dependent claims also contain additional features not taught by LeCrone.

For example, dependent claims 10 and 11 of the present invention, which are representative of dependent claims 21 and 22, reads as follows:

10. The method of claim 9, wherein performing the access request on one or more physical volumes associated with the secondary virtual volume includes converting the access request to a format suitable for the second media type.

11. The method of claim 1, wherein the access request is received using a first communication protocol and wherein performing the access request on one or more physical volumes associated with the secondary virtual volume includes converting the access request from the first communication protocol to a second communication protocol.

With regard to claims 10 and 11, the examiner stated:

As per claims 10-11 and 21-22, LeCrone discloses the invention as claimed, detailed above with respect to claims 1-9 and 12-20; LeCrone however does not particularly teach converting the access request to a format suitable for the second media type from the first communication protocol to a second communication protocol. Schumacher, in his teaching of sharing data between operating system having multiples virtual volumes wherein the first and second virtual volumes maps data stored in the disk array by extracting data from the first virtual volume in the first format and converting to the second format to transfer/copy to the second virtual volume which is compatible with the second data processing system (e.g. abstract; column 12, lines 10-24). According, it would having been obvious to one having ordinary skill in the art at the time the current invention was made to implement the format conversion process amongst different virtual volumes as taught by Schumacher that is

known to be required in the system of LeCrone in order to arrive at Applicant's current invention. In doing so, it would allow the data to be correctly read and executed amongst different stations or virtual volume units, thereby enhancing system reliability, system data coherency, therefore being advantageous.

Office Action, page 8 and 9.

Schumacher teaches a technique for sharing data between at least two operating systems. Schumacher, Abstract. Schumacher is a method for extracting database information and creating a flat file that is accessible and readable directly by a computer system that runs on an operating system that is different from the operating system used to create the database. Schumacher, column 2, lines 63-67. In other words, the method of Schumacher creates a second file or virtual volume, which is formatted for use in a different operating system, from a first file or virtual volume usable on a first operating system. Hence, an entire file or volume is created or formatted for an operating system.

In contrast, claim 10 of the present invention recites a method for converting a first media type access request to a format suitable for a second media type. In other words, an access request to a first media type containing requested data is formatted or converted to access a second media type containing the same information. However, Schumacher does not teach or suggest formatting the access request from a first media type to a second media type as recited in claim 10, but teaches formatting or creating an entire volume or file for use in a different operating system. Consequently, Schumacher does not teach or suggest the above recited claim 10 limitations.

With regard to claim 11, claim 11 recites a method for converting the access request from a first communication protocol to a second communication protocol. Schumacher makes no reference to a communication protocol. Therefore, Schumacher does not teach, nor does Schumacher suggest the desirability of, converting an access request from a first communication protocol to a second communication protocol as is recited in claim 11. Thus, Schumacher does not teach or suggest the features recited claim 11.

Accordingly, the rejection of dependent claims 10, 11, 21, and 22 as being unpatentable over LeCrone in view of Schumacher has been overcome.

III. 35 U.S.C. § 103, Obviousness, Claims 23-31

The examiner has rejected dependent claims 23-31 under 35 U.S.C. § 103 as being unpatentable over LeCrone. This rejection is respectfully traversed.

Amended independent claims 1 and 12 are representative of amended independent claim 23. As shown in Section I above, LeCrone does not teach or suggest that the original physical volumes are contained on a first type of storage media and the physical volumes are contained on a second type of storage media as recited in claim 23. Therefore, LeCrone does not teach or suggest all claim limitations recited in amended independent claim 23 of the present invention. Accordingly, the rejection of amended independent claims 23 as being anticipated by LeCrone has been overcome.

Furthermore, applicants agree with the examiner that LeCrone does not particularly disclose a computer-readable medium of instructions to be implemented on a computer as being claimed in claims 23, 25, and 27-31. Office Action, page 9. Claims 23, 25, and 27-31 are the computer program product claims of method claims 1, 3, 5-9, and apparatus claims 12, 14, 16-20, respectively. The examiner takes Official Notice and states that one of ordinary skill in the art would have recognized that computer readable medium (i.e., floppy, cd-rom, etc.) carrying computer-executable instructions for implementing a method, because it would facilitate the transporting and installing of the method on other systems, is generally well-known in the art. Office Action, page 9.

The mere fact that a process or device utilizes a known scientific principle does not make that process or device obvious. *In re Van De Vondervoort*, 77 F.3d 422, 425, 37 U.S.P.Q.2d 1663, ___ (Fed. Cir. 1995). In other words, the present invention is not rendered obvious just because the present invention recites a known principle. The present invention recites a computer program product in order for the presently claimed invention to function. However, reciting a computer program product in claims 23, 25, and 27-33 does not automatically make the present invention obvious.

In addition, applicants respectfully traverse the examiner's Official Notice and request that the examiner provide either a prior art reference or an affidavit in support of the Official Notice. The examiner must rely on a reference for describing the level of ordinary skill. *In re Pardo*, 684 F.2d 912 (C.C.P.A. 1982). If the applicant traverses such an assertion, the examiner should cite a reference in support of his position. *In re*

Malcolm, 129 F.2d 529 (C.C.P.A. 1942); MPEP § 2144.03. Moreover, if the examiner is basing the rejection on facts within the examiner's own personal knowledge, applicants respectfully request that the examiner comply with 37 CFR § 1.104(d)(2) and provide support for the examiner's argument in the form of an affidavit "subject to contradiction or explanation by the affidavits of the applicant or other persons." (37 CFR § 1.104(d)(2)). Otherwise, the examiner has not met the *prima facie* burden of proving obviousness.

In view of the above arguments, amended independent claim 23 is in condition for allowance. As a result, claims 25 and 27-31 are dependent claims depending on independent claim 23. Consequently, claims 25 and 27-31 also are allowable, at least by virtue of their dependence on allowable claims. Furthermore, these dependent claims also contain additional features not taught by LeCrone. Claims 9 and 20 are representative of claim 31. Consequently, the arguments contained in Section I above with regard to claims 9 and 20 are relevant and herein applied. Therefore, LeCrone does not teach or suggest the recited claim 31 features.

Accordingly, the rejection of dependent claims 23-31 as being unpatentable over LeCrone has been overcome.

IV. 35 U.S.C. § 103, Obviousness, Dependent Claims 32-33

The examiner has rejected dependent claims 32-33 under 35 U.S.C. § 103 as being unpatentable over LeCrone in view of Schumacher. This rejection is respectfully traversed.

As shown in Section III above, LeCrone does not teach or suggest all the claim limitations recited in amended independent claim 23. In particular, LeCrone does not teach or suggest that the original physical volumes are contained on a first type of storage media and the physical volumes are contained on a second type of storage media as recited in claim 23. These recited features are also not taught or suggested in Schumacher.

Therefore, because neither LeCrone nor Schumacher teach or suggest the claim limitations recited above in amended independent claim 23, the combination of LeCrone and Schumacher cannot teach or suggest these features. As a result, claims 32 and 33 of

the present invention also are allowable at least by virtue of their dependence on an allowable claim. Furthermore, these dependent claims also contain additional features not taught by LeCrone and Schumacher. Claims 10, 11, 21, and 22 are representative of claims 32 and 33, respectively. Consequently, the arguments contained in Section II above are relevant and herein applied. Thus, the combination of LeCrone and Schumacher does not teach or suggest the recited limitations of claims 32 and 33.

Accordingly, the rejection of dependent claims 32 and 33 as being unpatentable over LeCrone in view of Schumacher has been overcome.

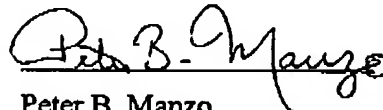
V. Conclusion

It is respectfully urged that the subject application is patentable over the cited references and is now in condition for allowance.

The examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,



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